Symons's Meteorological Magazine.

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REPORT OF WATER POWER COMMITTEE.

The Board of Trade Committee on the Water Power Resources of the United Kingdom, of which Sir John Snell is Chairman, has issued an Interim Report to the President of the Board of Trade which has been published by the Stationery Office as Cmd. 79 of 1919, at the price of 2d. The Report deals not with the total resources of the country but with certain specific schemes for developing water-power in the Scottish Highlands. These are representative of many others and were selected as typical instances in which large powers could be economically developed. The value of the schemes depends partly on the possibility of transmitting electrical energy to industrial centres at a distance from the generating station and partly on the possibility of establishing new industries on the sea-board close to the source of power. In both cases the controlling factor is the cost of the necessary works and this is based on the reports of eminent engineers accustomed to the planning of large works, such as the Foyers and Kinlochleven establishments of the British Aluminium Company and the North Wales works of the British Aluminium Corporation. All the estimates are based on pre-war contract prices, plus fifty per cent. The Committee states that a Water Power scheme producing 5,000 electrical horse-power continuously and fully utilised will compare favourably with the best coal-fired electric generators of equal power with coal at 10s. per ton, if the capital cost of the undertaking does not exceed £60 per e.h.p.

Nine schemes are indicated in the Report on which work could be commenced as soon as the necessary Parliamentary powers are obtained. These range from 7,200 e.h.p., at Loch Morar, to 42,000 e.h.p. for a combined system of Lochs Ericht, Laidon, Rannoch and Tummel, and the estimated capital cost varies from £17 per e.h.p. for a 9,500 e.h.p. station, at Kilmorack Falls, to nearly £46 per e.h.p. for a 38,000 e.h.p. scheme at Lochs Laggan and Treig. The total electrical horse power of the nine schemes set out is estimated at 183,500, the total estimated cost at £7,075,000, which works out at £38·5 per e.h.p. on the average. The nine schemes would produce power equal to that yielded by 1,850,000 tons of

coal per annum, a figure which shows how absurd was the estimate of the Royal Commission on Coal Supplies in 1906 that all the available water power of the British Isles would be equivalent only to 1,200,000 tons of coal per annum. We are not aware that the Royal Commission referred to took any steps to obtain an authoritative estimate of the water power of the country, and their bad shot suggests that they did not. On the other hand we must bear in mind that the dreams of unlimited power to be obtained from water, which are frequently expounded in the newspapers, are even wider of the mark. The true value of the water power of any country can only be determined by careful and long continued surveys.

We cannot enter here into all the interesting features of this Report, but we must express our appreciation of the wise action of the Government in initiating a thorough enquiry into the subject, the results of which will doubtless be more fully developed in subsequent Reports. We may, however, quote from the concluding paragraphs which are of a general nature and point the way to future developments :—

> "There is no question that a river system and its drainage area must be taken as a unit and dealt with as a whole in regard to all the water problems incidental thereto. In this connection the Committee desires to draw attention to the recommendations of Lord Elgin's Commission on Salmon Fisheries, 1902, which advocated, *inter alia*, the setting up of Watershed Boards under a Supreme Rivers Authority. . . .
>
> The Committee wishes to draw attention to the fact that the estimates of water power dealt with in this Report have only been made possible by the voluntary work of Rainfall Observers in all parts of the British Isles, which has been collected and discussed by the British Rainfall Organization during the past 58 years. If the fullest use is to be made of the water-power resources of this country, it is essential that the work of observation should not only continue, but should be encouraged and developed.
>
> Another branch of observation which has a vital bearing upon the question of water-power resources is the gauging of the flow of rivers. Great attention has been given to this subject in Canada and the United States, but only a small amount of observation has hitherto been carried out in this country.
>
> Strong evidence has been submitted to the Committee regarding the lack of adequate training facilities in the Universities and Technical Institutes of the United Kingdom for young engineers wishing to enter the field of hydro-electric development. In view of the very large extension of water power development that is practically certain to take place in the near future, both in this country, in the British Empire, and in other countries, the Committee consider it important in the interests of British industry, that steps should be taken to remedy this state of affairs. . . ."

ROYAL METEOROLOGICAL SOCIETY.

THE usual annual lecture of this Society was delivered on Wednesday the 19th March, at the rooms of the Geological Society, Burlington House, by Professor Leonard Hill, F.R.S., the subject being "Atmospheric Conditions which affect Health." The President of the Society, Sir Napier Shaw, F.R.S., was in the Chair.

The lecturer first considered how far published meteorological data explained the influence of weather and climate on health and comfort, and in what way these data might be amplified to gain a better insight into this important matter. Numerous Observers make records of barometric pressure, temperature, rainfall, wind, etc., but the question arises as to whether there are not other data of greater importance and interest, which affect personal health and comfort and which might be recorded by them. Barometric pressure, is measured with much refinement of accuracy, but we have no sensibility of the pressure of the atmosphere, which acts equally upon all parts of the body. In the past much has been made of the chemical alteration of the air in crowded places, and a false doctrine has become established and made popular. Careful analysis has shown that neither is there such a deficiency of oxygen or an excess of carbonic acid or other poisonous gas in the air of crowded rooms as to affect the health of human beings. Our feelings are largely due to swelling of the membrane of the nose and of its air sinuses. The victims of the Black Hole of Calcutta died from heat stroke, not from a poisonous vitiation of the air by the exhalations of the crowd. It is the cooling and evaporative power of the atmosphere, and the radiant heat of the sun, or other source of radiant energy, which have a colossal effect on our comfort and well-being, and it is these factors which require to be measured by the student of hygiene. The dry-bulb temperature does not suffice to indicate the cooling effect, because it is a static instrument averaging the influence of the environment, while the body is a dynamic instrument keeping itself at a nearly constant body temperature by the internal combustion of food and by heat loss from the skin and respiratory membrane, the heat gain and loss both being physiologically controlled. It is cooling power acting on the body surface, not temperature, which we require to study, and as the surface of the respiratory membrane is always wet and the skin may be made relatively dry or very wet by physiological control evaporative cooling is of no less importance than cooling by convection and radiation. To estimate cooling power Prof. Hill has introduced the kata-thermometer. This is a large bulbed spirit thermometer graduated between 100 and 95°F., giving a mean temperature of 36·5°C. which is arbitrarily taken as the surface temperature of the body. The instrument is heated in water at about 80°C., until the meniscus enters the small bulb at the top

of the stem ; the rate of cooling from 100° to 95°F. is then measured in seconds. Three to five such measurements are made and the average taken gives the dry kata reading. The bulb is then covered with a wetted muslin glove, and the operation repeated. The average gives the wet kata reading. Many thousands of kata observations have been taken in this country, also many in India, Egypt, Salonica front, Mesopotamia ; also some in New York, Nigeria and Melbourne. These admit of a contrast between indoor and outdoor conditions, and the conclusion is reached by Prof. Hill that the ordinary indoor conditions of this country approximate to outdoor conditions in such a humid tropical climate as Ceylon, admittedly an enervating climate to Europeans.

The following Candidates were balloted for and elected Fellows of the Society :—Lieut. H. C. Abraham, Lieut. R. P. Batty, F. G. Beaumont, Lieut. D. F. Bowering, Lieut. A. Mervyn Davies, W. E. Frankenburg, R. E. Horton, A. A. Kidson, Samuel Kniveton, Miss L. F. Lewis, A. H. Lupton, Sergt. F. L. Nunn, Sapper E. N. Redsell, C. F. Reed, T. A. Small, Lieut. A. Stocks.

METEOROLOGICAL OBSERVATIONS AT LU-KIA-PANG, CHINA, FOR 1918.

By Rev. J. de Moidrey S.J.

We have again been favoured by the kindness of Rev. J. de Moidrey, S.J., with summaries of the meteorological observations for 1918 at Lu-Kia-Pang, China, drawn up on similar lines to those for previous years, the first of which, for the year 1914, appeared in this Magazine for April, 1916. The records up to 1913 inclusive were published in the *Meteorologische Zeitschrift*.

I.—*Barometric Pressure. Millibars.*

	8 a.m.	2 p.m.	8 p.m.	Daily Mean.
Jan.	**1030·42**	**1028·29**	**1029·79**	**1029·57**
Feb.	26·19	24·19	25·41	25·31
Mar.....	21·86	20·15	21·06	21·02
April	15·43	14·05	14·78	14·70
May	11·47	09·94	10·12	10·43
June	06·96	05·82	06·24	06·26
July	*02·78*	*01·76*	*02·31*	*02·19*
Aug.	08·20	06·99	07·55	07·47
Sept.	12·24	10·58	11·70	11·40
Oct.	20·35	18·51	19·69	19·44
Nov.	24·24	22·41	23·82	23·44
Dec.	26·13	23·95	25·20	25·08
Year	1017·19	1015·55	1016·47	1016·36

IV.—*Mean amount of Cloud.*

Jan.	2·2
Feb.	6·7
Mar.	7·1
April	7·6
May	7·4
June	**8·7**
July	6·9
Aug.	5·6
Sept.	5·8
Oct.	4·9
Nov.	6·8
Dec.	8·0
Year	6·5

V.—*Days with Thunderstorms.*

Jan	—
Feb.	—
Mar.	—
April	2*a*
May	2
June	2
July	3
Aug.	8
Sept.	—
Oct.	—
Nov.	2*b*
Dec.	—
Year	19

a First, April 20 *b* Last, November 5.

II.—*Temperature. Degrees Centigrade.*

	MEAN DAILY.			MINIMUM.				
	Mean.	Lowest.	Highest.	Mean.	Hour. hr.	A.M. min.	Lowest.	Highest.
	°	°	°	°			°	°
Jan.	+0·27	—3·2	+3·5	—4·6	4	55	—8·2	+0·5
Feb.	·5·43	+1·2	15·7	+1·5	5	25	—4·0	11·9
Mar.	7·82	1·9	15·6	4·1	4	40	—2·9	11·0
April	13·44	7·7	20·3	9·8	4	10	+1·7	15·6
May	18·73	12·4	23·4	14·2	4	0	7·8	19·9
June	23·08	18·3	29·3	19·7	3	40	14·0	25·0
July	26·97	22·6	29·2	23·7	3	55	20·8	**25·8**
Aug.	**27·24**	23·8	**29·8**	**23·8**	4	5	21·3	25·3
Sept.	22·87	17·2	27·8	19·1	4	45	12·3	25·2
Oct.	17·42	14·2	21·2	13·1	4	40	8·6	19·5
Nov.	11·07	4·9	18·9	8·0	4	55	0·5	17·4
Dec.	6·84	—0·6	11·9	4·9	4	35	—4·6	10·4
Year	15·10	—3·2*a*	29·8*b*	11·4	4	30	—8·2*c*	25·8*d*

Latest frost, March 2nd (—2°·9); earliest, December 10th (—0°·3).

II.—(*con.*)

	MAXIMUM				RANGE.		
	Mean.	Hour. hr.	P.M. min	Lowest.	Highest.	Mean.	Lowest.	Highest.
	°			°		°	°	°
Jan.	+6·9	14	10	+1·2	+13·4	**11·5**	4·3	16·8
Feb.	10·9	13	55	3·7	26·1	9·4	2·5	**19·4**
Mar.	12·6	13	50	5·3	25·5	8·5	2·6	19·2
April	18·1	13	35	10·6	29·1	8·3	*1·3*	17·5
May	24·4	13	40	15·5	31·0	10·2	3·7	14·9
June	27·3	13	35	20·9	34·7	7·6	2·3	14·6
July	31·3	14	5	24·8	**35·6**	7·6	2·1	10·8
Aug.	**32·0**	13	40	26·0	35·4	8·2	3·5	11·2
Sept.	28·4	13	25	22·0	33·5	9·2	5·0	13·1
Oct.	23·7	13	5	18·2	27·1	10·6	2·8	15·5
Nov.	15·3	13	15	10·4	23·1	7·3	1·8	15·4
Dec.	9·6	13	10	2·8	15·1	*4·6*	*1·3*	11·2
Year	20·0	13	35	1·2*e*	35·6*f*	8·6	1·3*g*	19·4*h*

a Jan. 8. *b* Aug. 16. *c* Jan. 3. *d* July 8. *e* Jan. 7. *f* July 27. *g* April 6, Dec. 22. *h* Feb. 25

III.—*Relative Humidity. Per Cent.*

	RELATIVE HUMIDITY.			VAPOUR TENSION.		
	Mean.	Lowest.	Highest.	Mean.	Lowest.	Highest.
Jan.	*60*	*42*	82	*2·7*	*1·7*	4·6
Feb.	73	44	94	4·9	2·9	8·4
Mar.	79	54	97	6·6	4·0	9·5
April	80	55	95	9·7	6·2	14·9
May	71	48	95	12·2	8·0	17·2
June	81	62	**98**	17·9	12·1	24·8
July	**83**	68	97	22·6	19·1	**26·1**
Aug.	81	68	94	**22·8**	17·6	24·5
Sept.	77	57	94	16·8	8·3	23·8
Oct.	76	60	89	11·9	8·6	16·8
Nov.	80	61	97	8·4	4·7	15·4
Dec.	**83**	69	**98**	6·4	3·2	9·5
Year	77	42	98	11·9	1·7	26·1

(*To be continued*).

Correspondence.

To the Editor of Symons's Meteorological Magazine

RAINFALL AT HAVANA AND IN SOUTH-WEST ENGLAND.

For several years past attention has been drawn to the connection between the rainfall at Havana during the wet season, May to October, and that subsequently experienced in the south-west of England during the three months, January to March. This connection is shown by the correlation coefficient of —0·54, and implies that a heavy seasonal rainfall at Havana should be followed by a light rainfall during January to March in England S.W., and *vice versa*.

During May to October, 1918, the rainfall at Havana was only 42 per cent. of the fifty years' average, being the smallest amount for the season since the record started in 1859. In the south-west England for the three months now just closing the rainfall has been phenomenally heavy, the total being 155 per cent. of the average, and the wettest three first months of the year since at least 1878. Nine weeks out of the thirteen have been wetter than the average, one or two showing very large totals.

The following table gives the seasonal figures for the two districts during the past few years.

	Havana, May-October.	England, S.W., Jan.-March following.		Havana, May-October.	England, S.W. Jan.-March following.
1905 ..	49	148	1912 ..	108	139
1906 ..	143	66	1913 ..	87	138
1907 ..	60	84	1914 ..	71	129
1908 ..	116	82	1915 ..	82	126
1909 ..	101	116	1916 ..	74	67
1910....	108	81	1917 ..	57	94
1911 ..	66	146	1918 ..	42	155

A. HAMPTON BROWN.

70, Victoria Street, S.W. 1, March 31st, 1919.

SNOW FOLLOWING FINE WEATHER.

The following considerations seem to show that the sequence of weather to which Dr. C. P. Hooker calls attention in your last issue, where an exceptionally fine day in early spring is followed by snow within a short period, is capable of a reasonable explanation. It not infrequently happens that a short period of brilliantly fine

weather is found in the rear of an anticyclone which is being pushed away eastward by a depression advancing towards this country from the Atlantic. If the advancing depression takes a southerly track and moves up the English Channel the cold north or north-east winds in its rear may very probably be accompanied by snowfall in the south of England, and thus snow following shortly after a brilliantly fine day is seen to be not improbable. On the other hand there must surely be many such fine days which are unassociated with a subsequent snowfall. If Dr. Hooker could supply the dates in previous years on which he has noticed this phenomenon it would be easy to test the above hypothesis. A study of the synoptic charts for the date in early March quoted in his letter shows that that occasion was of this type although it did not form a very good example and I doubt whether the fineness of March 2nd extended over a very wide area. At Benson, in South Oxfordshire, it was, as far as I remember, not an exceptionally fine day.

66, Sydney Street, S.W. 3, March 27th, 1919. J. S. DINES.

THE SLING OR WHIRLED PSYCHROMETER.

In the number of years in which I have been an interested reader of your Magazine I am unable to recall any reference or discussion as to the respective merits of wet and dry bulb thermometers and the sling, or whirled psychrometer. For some years I have been obtaining the relative humidity and dew point from the former, and not very long ago made a series of comparisons of the readings of both instruments. The wet and dry bulb thermometers were exposed in a standard instrument shelter, and sling psychrometer was whirled in the immediate vicinity facing the wind. I found such a wide difference in the readings that I have discarded the older instrument and now use the sling. In fact I do not consider the records observed on the old type as scientifically accurate.

The United States Weather Bureau began the use of the sling psychrometer in 1886. In connection with this instrument they say :—

> "The most reliable instrument for this purpose (to observe the difference between the temperatures indicated by wet and dry bulb thermometers) is the sling, or whirled psychrometer. In special cases rotary fans, or other means, may be employed to move the air rapidly over the thermometer bulbs. In any case satisfactory results cannot be obtained from observations in relatively stagnant air. A strong ventilation is absolutely necessary to accuracy."

When temperatures are below the freezing point the ease and celerity with which observations can be taken with the sling is very satisfactory. CHAS. DECKER.

Narberth, Pa., U.S.A., February 14th, 1919.

WET FIRST QUARTER OF YEAR.

I find that only twice during eighty years have we had more than 12 inches of rain in the first quarter of any year, and my object in looking up the figures was to find out whether there were droughts in the following quarters.

I send you the result of my search and the eighty years average.

	First Quarter in.	Second Quarter in.
Average 1839-1918 ..	6·48	5·34
,, 1844 ..	12·17	2·09
,, 1866 ..	12·76	3·96
,, 1919 ..	12·92	—

West Gate, Chichester, April 1st, 1919. G. ASHLEY TYACKE.

The rainfall at Totland Bay during the first quarter of the year 1919 amounts to 12·48 in. Our average here for this period is 6·46 in. The only first quarters giving over 10 inches total during my residence of thirty-three years have been :—

	1897	*1900*	*1906*	*1912*	*1919*
January ..	2·45	3·60	6·80	4·12	4·81
February ..	3·41	5·07	3·13	2·62	2·83
March ..	4·30	1·47	1·44	3·41	4·84
Total ..	10·16	10·14	11·37	10·15	12·48

JOHN DOVER.

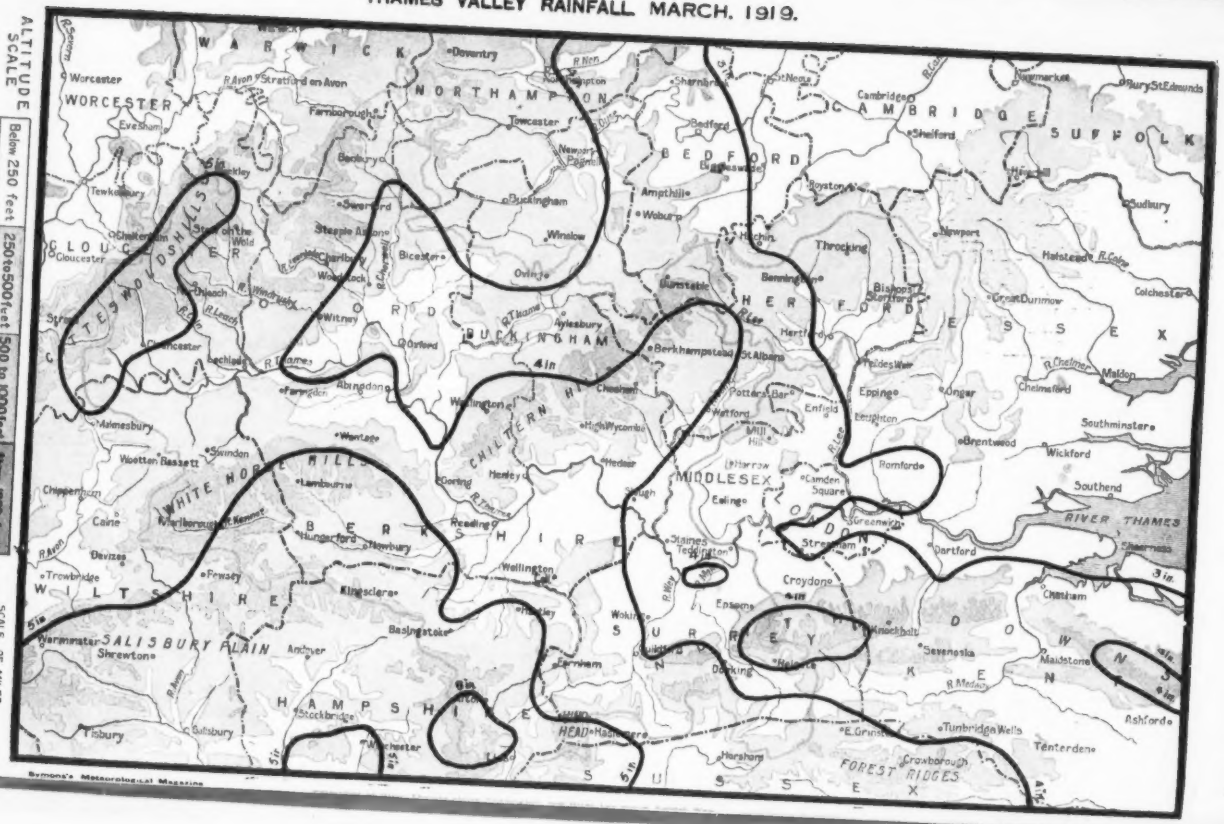
Aston House, Totland Bay, Isle of Wight, 1st April, 1919.

REMARKABLE UNIFORMITY OF TEMPERATURE.

The phenomenon mentioned by the Rev. T. E. R. Phillips of a fall of temperature by day and a rise by night during cold, cloudy, easterly weather in winter is one which I have often noticed ; but I believe it is more pronounced in the south of England than elsewhere. The explanation, I believe, is that in this type of weather there is severe cold on the Continent, often with clear skies, and the low temperature of early morning is carried to our shores by the east wind in the course of the day, while the higher temperature of the sunny daytime on the Continent similarly arrives during the following night. Our skies are cloudy owing to the vapour gathered by the wind in crossing the North Sea, hence the warming influence of the sun by day is shut out from us. I have noticed this inversion of the usual temperature change here in Lincolnshire, but it used to be more pronounced in Hertfordshire. ALLAN ELLISON.

Althorpe Rectory, Lincolnshire. March 27th, 1919.

THAMES VALLEY RAINFALL. MARCH. 1919.



Symons's Meteorological Magazine

THE WEATHER OF MARCH.

SOME of the most disagreeable weather we experience in these islands occurs when the country occupies a position between two areas of high barometric pressure. The intervening trough forms a prolific breeding ground for cyclonic depressions; and as the driving power (if one may so express it) of the nearest high pressure system is largely restrained by the driving power of its more distant compeer such disturbances usually move slowly, and the accompanying bad weather is consequently of a more or less lingering character.

These were the conditions prevailing during a considerable portion of last month. A large anticyclone maintained a fairly normal position over the south of the North Atlantic, but at frequent intervals there was a second high pressure system in existence, sometimes in the Icelandic region, at other times over northern Europe. In these circumstances the British Isles were exposed to numerous depressions, many of which travelled in a general easterly course over our southern districts, the Channel and the north of France. In the south the winds showed considerable variability in direction, but over the country as a whole they were more often than not from some polar quarter, and as a result the mean temperature of the month was considerably below the average.

During the earlier half the weather was changeable and wet, more especially in the western districts. Temperature was usually below the normal, but, during a brief period of south-westerly winds which prevailed at the beginning of the month, and a similar spell which occurred between the 9th and 11th, the thermometer rose slightly above 55° in many parts of England. Sharp frost was experienced, however, in Ireland and Scotland on the night of the 3rd, over England on the night of the 5th, and over the United Kingdom generally between the 13th and 15th.

After about the middle of the month the weather (contrary to rule) became colder even than in the earlier half, and between the 23rd and 26th, when an anticyclonic band extended temporarily from south-west to north-east across the United Kingdom, sharp frosts were experienced in all districts. In many parts of England the screened thermometer fell below 25°, and at some northern stations below 20°, a minimum of 11° being reported on the 25th at Balmoral. On the 26th and 27th the passage south-eastward of a deep storm system from Iceland to Scotland, and thence across the North Sea was accompanied by a general gale from the N.W.; and, on the night of the 28th-29th, when a secondary depression moved eastward along the Channel, a heavy fall of snow was experienced in the south of England. In London the flakes were of a remarkably fine texture, and although the ground was covered to the unusual depth of 7 to 10 inches, the snow, when melted, did not yield more than ·25 in. to ·30 in. of water in the gauge.

The total duration of bright sunshine for the month was below the average in all districts except the north and east of Scotland.

The total rainfall of the month exceeded twice the average over practically all England and Wales, except in the eastern and extreme northern counties. The amounts varied from about 2 inches in East Anglia to more than 5 inches over large areas in the south and Midlands, and rose to above 10 inches in the Welsh mountains and the Lake District. In Scotland the excess was not remarkable and in many areas the fall was short of the average. Less than 2 inches fell on the east coast and from 5 to 10 inches in the wettest parts of the Highlands. Ireland was wet generally, but a few scattered stations had less than the average. Less than 2 inches fell over the centre, and 5 inches was exceeded only in the extreme west.

The general rainfall expressed as a percentage of the average was :—England and Wales, 196; Scotland, 105; Ireland, 112; British Isles, 143.

In London (Camden Square) the mean temperature was 40°·5, or 1°·6 below the average. The duration of sunshine was 83·3 hours, and of rainfall 103·2, hours the latter being the highest value recorded in March in the past thirty-nine years, except in March, 1916, when it rained for 133·6 hours. Evaporation, ·66 inches.

RAINFALL TABLE FOR MARCH, 1919.

STATION.	COUNTY.	RAINFALL. Aver. 1875–1909. in.	1919. in.	Diff. from Av. in.	Per cent. of Av.	Max. in 24 hours. in.	Max. in 24 hours. Date.	No. of Days
Camden Square	*London*	1·70	3·62	+1·92	213	·88	19	21
Tenterden	*Kent*	1·95	3·51	+1·56	180	·70	5	20
Arundel (Patching)	*Sussex*	1·95	5·36	+3·41	275	1·14	19	19
Fordingbridge (Oaklands)	*Hampshire*	2·09	5·47	+3·38	261	1·11	19	19
Oxford (Magdalen College)	*Oxfordshire*	1·45	3·76	+2·31	259	1·01	19	22
Wellingborough (Swanspool)	*Northampn*	1·72	3·91	+2·19	228	·94	19	20
Bury St. Edmunds (Westley)	*Suffolk*	1·71	2·40	+ ·69	140	·32	7	17
Geldeston [Beccles]	*Norfolk*	1·57	1·78	+ ·21	113	·27	7	17
Polapit Tamar [Launceston]	*Devon*	2·74	5·37	+2·63	196	·68	10	23
Rousdon [Lyme Regis]	,,	2·30	4·95	+2·65	215	1·12	18	19
Stroud (Field Place)	*Gloucester*	2·01	4·37	+2·36	218	...	...	...
Church Stretton (Wolstaston)	*Shropshire*	2·19	5·29	+3·10	241	1·36	12	9
Boston	*Lincoln*	1·47	2·47	+1·00	168	·43	19	22
Worksop (Hodsock Priory)	*Nottingham*	1·70	3·59	+1·89	211	·85	11,19	15
Mickleover Manor	*Derbyshire*	1·69	5·23	+3.54	309	1·27	19	21
Congleton (Buglawton Vic.)	*Cheshire*	2·16	4·90	+2·74	227	·82	11	21
Southport (Hesketh Park)	*Lancashire*	2·11	5·31	+3·20	252	1·25	11	17
Wetherby (Ribston Hall)	*York, W.R.*	1·92	3·88	+1·96	202	1·23	19	11
Hull (Pearson Park)	,, *E.R.*	1·84	2·67	+ ·83	145	·55	11	17
Newcastle (Town Moor)	*North'land*	2·10	2·76	+ ·66	131	·53	9	18
Borrowdale (Seathwaite)	*Cumberland*	10·63	11·30	+ ·67	106	...	...	...
Cardiff (Ely)	*Glamorgan*	2·89	5·97	+3·08	207	·64	18	22
Haverfordwest	*Pembroke*	3·16	5·55	+2·39	176	1·20	18	20
Aberystwyth (Gogerddan)	*Cardigan*	3·04	8·57	+5·53	282	1·97	11	19
Llandudno	*Carnarvon*	2·13	5·75	+3·62	270	1·55	11	24
Cargen [Dumfries]	*Kirkcudbrt.*	3·33	4·83	+1·50	145	2·11	19	13
Marchmont House	*Berwick*	2·64	2·78	+ ·14	105	·44	19	18
Girvan (Pinmore)	*Ayr*	3·62	4·37	+ ·75	121	1·03	20	14
Glasgow (Queen's Park)	*Renfrew*	2·61	2·62	+ ·01	100	·65	19	10
Islay (Eallabus)	*Argyll*	3·68	5·23	+1·55	142	1·02	18	19
Mull (Quinish)	,,	4·28	4·24	— ·04	99	·76	18	21
Loch Dhu	*Perth*	6·29	5·95	— ·34	95	1·15	19, 26	13
Dundee (Eastern Necropolis)	*Forfar*	2·06	1·64	— ·42	80	·42	19	18
Braemar	*Aberdeen*	2·87	4·51	+1·64	157	1·00	27	16
Aberdeen (Cranford)	,,	2·65	2·16	— ·49	82	·47	27	20
Gordon Castle	*Moray*	2·36	2·09	— ·27	89	...	...	...
Drumnadrochit	*Inverness*	3·09	2·72	— ·37	88	·85	26	21
Fort William	,,	6·39	3·95	—2·44	62	1·22	26	19
Loch Torridon (Bendamph)	*Ross*	7·29	7·99	+ ·70	110	2·29	26	20
Dunrobin Castle	*Sutherland*	2·64	2·77	+ ·13	105	·55	26	10
Glanmire (Lota Lodge)	*Cork*	3·09	3·07	— ·02	99	·40	13	20
Killarney (District Asylum)	*Kerry*	4·51	3·71	— ·80	82	·52	28	27
Waterford (Brook Lodge)	*Waterford*	2·64	2.96	+ ·32	112	·36	3	23
Nenagh (Castle Lough)	*Tipperary*	2·99	3·29	+ ·30	110	·46	12	25
Ennistymon House	*Clare*	3·24	3.11	— ·13	96	·41	12	19
Gorey (Courtown House)	*Wexford*	2·28	2·48	+ ·20	109	·39	28	14
Abbey Leix (Blandsfort)	*Queen's Co.*	2·59	2·94	+ ·35	113	·62	4	22
Dublin (Fitz William Square)	*Dublin*	1·98	2·19	+ ·21	111	·38	18	21
Mullingar (Belvedere)	*Westmeath*	2·64	1·83	— ·81	69	·42	19	15
Crossmolina (Enniscoe)	*Mayo*	4·36	5·39	+1·03	124	·95	6	26
Cong (The Glebe)	,,	3·80	...	...	...	...	...	...
Collooney (Markree Obsy.)	*Sligo*	3·33	4·07	+ ·74	122	·66	17	20
Seaforde	*Down*	2·84	3·86	+1·02	136	1·45	18	17
Ballymena (Harryville)	*Antrim*	3·07	4·70	+1·63	153	1·22	17	22
Omagh (Edenfel)	*Tyrone*	2·98	·99	+1·01	134	.88	18	

SUPPLEMENTARY RAINFALL, MARCH, 1919.

Div.	STATION.	Rain inches.	Div.	STATION.	Rain inches.
II.	Warlingham, Redvers Road..	4·86	XI.	Lligwy	5·18
,,	Ramsgate	2·70	,,	Douglas, Isle of Man	4·72
,,	Hailsham	4·39	XII.	Stoneykirk, Ardwell House...	3·49
,,	Totland Bay, Aston House...	4·84	,,	Carsphairn, Shiel	6·81
,,	Stockbridge, Ashley..	4·85	,,	Langholm, Drove Road	4·95
,,	Grayshott	5·44	XIII.	Selkirk, The Hangingshaw..	4·73
,,	Upton Nervet	5·35	,,	North Berwick Reservoir.....	1·47
III.	Harrow Weald, Hill House...	3·48	,,	Edinburgh, Royal Observaty.	1·34
,,	Pitsford, Sedgebrook.....	4·11	XIV.	Biggar.....	2·24
,,	Woburn, Milton Bryant.....	...	,,	Maybole, Knockdon Farm ...	2·45
,,	Chatteris, The Priory.....	2·08	XV.	Shiskine	5·57
IV.	Elsenham, Gaunts End	2·63	,,	Ardgour House	4·81
,,	Shoeburyness	...	,,	Oban.....	3·16
,,	Colchester, Hill Ho., Lexden	2·21	,,	Holy Loch, Ardnadam.....	6·81
,,	Aylsham, Rippon Hall	2·04	,,	Loch Venachar.....	4·95
,,	Swaffham	2·26	XVI.	Glenquey	3·90
V.	Bishops Cannings	4·85	,,	Loch Rannoch, Dall	3·29
,,	Weymouth.....	4·68	,,	Blair Atholl	2·66
,,	Ashburton, Druid House.....	7·03	,,	Coupar Angus	1·90
,,	Cullompton	4·99	,,	Montrose, Sunnyside Asylum.	1·54
,,	Lynmouth, Rock House	6·01	XVII.	Balmoral	3·25
,,	Okehampton, Oaklands.....	6·44	,,	Fyvie Castle	3·13
,,	Hartland Abbey.....	3·88	,,	Keith Station	3·04
,,	St. Austell, Trevarna	5·90	XVIII.	Rothiemurchus	...
,,	North Cadbury Rectory.....	4·65	,,	Loch Quoich, Loan	10·40
VI.	Clifton, Stoke Bishop	5·70	,,	Skye, Dunvegan	6·23
,,	Ledbury, Underdown..... ...	4·61	,,	Fortrose.....	1·95
,,	Shifnal, Hatton Grange.....	4·78	,,	Glencarron Lodge	5·25
,,	Droitwich.....	3·97	XIX.	Tongue Manse	3·99
,,	Blockley, Upton Wold.....	5·42	,,	Melvich	3·46
VII.	Grantham, Saltersford.....	3·92	,,	Loch More, Achfary	7·27
,,	Louth, Westgate	3·22	XX.	Dunmanway, The Rectory ..	4·65
,,	Bawtry, Hesley Hall	3·15	,,	Mitchelstown Castle.....	2·92
,,	Derby, Midland Railway.....	4·41	,,	Gearahameen	7·50
VIII.	Nantwich, Dorfold Hall	5·28	,,	Darrynane Abbey.....	4·54
,,	Bolton, Queen's Park	7·31	,,	Clonmel, Bruce Villa	2·90
,,	Lancaster, Strathspey	4·41	,,	Roscrea, Timoney Park	2·48
IX.	Langsett Moor, Up. Midhope	5·67	,,	Broadford, Hurdlestown.....	2 96
,,	West Witton	4·87	XXI.	Enniscorthy, Ballyhyland...	3·30
,,	Scarborough, Scalby	4·94	,,	Rathnew, Clonmannon	2·21
,,	Ingleby Greenhow	4·33	,,	Hacketstown Rectory	...
,,	Mickleton	1·50	,,	Ballycumber, Moorock Lodge	1·61
X.	Bellingham, High Green Manor	2·87	,,	Balbriggan, Ardgillan	2·18
,,	Ilderton, Lilburn Cottage ...	2·47	,,	Castle Forbes Gardens.....	2·26
,,	Keswick, The Bank.....	5·03	XXII.	Ballynahinch Castle.....	3·93
,,	Orton.....	6·05	,,	Woodlawn	1·11
XI.	Llanfrechfa Grange	6·43	,,	Westport House	3·77
,,	Treherbert, Tyn-y-waun	10·90	,,	Dugort, Slievemore Hotel ...	6·07
,,	Carmarthen, The Friary	6·42	XXIII.	Enniskillen, Portora.....	2·67
,,	Fishguard, Goodwick Station.	4·12	,,	Dartrey [Cootehill]	2·76
,,	Crickhowell, Tal-y-maes.....	6·50	,,	Warrenpoint, Manor House ..	2·71
,,	Birmingham WW., Tyrmynydd	8·12	,,	Belfast, Cave Hill Road	4·29
,,	Lake Vyrnwy	7·43	,,	Glenarm Castle	3·37
,,	Llangynhafal, Plas Drâw.....	4·70	,,	Londonderry, Creggan Res...	4·68
,,	Rhiwbryfdir	11·99	,,	Milford Manse	4·06
,,	Dolgelly, Bryntirion.....	8·70	,,	Killybegs	6·54

Climatological Table for the British Empire, October, 1918.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Absolute. Maximum. Date.	Absolute. Minimum. Temp.	Absolute. Minimum. Date.	Average. Max.	Average. Min.	Average. Dew Point.	Average. Humidity.	Absolute. Max. in Sun.	Absolute. Min. on Grass.	Total Rain Depth.	Total Rain Days.	Aver. Cloud.
	°		°		°	°	°	0-100	°	°	inches		
London, Camden Square	64·5	6	32·4	1	57·2	43·8	...	90	113·6	28·2	1·23	16	8·1
Malta	86·0	1	57·0	10	73·9	65·7	62·5	82	133·5	53·5	4·28	9	2·6
Lagos	90·0	24	69·4	8	86·1	74·1	73·4	77	162·4	66·0	4·11	14	7·2
Cape Town	83·9	27	40·9	4	69·9	54·1	53·4	73	...	...	1·73	10	5·8
Johannesburg	83·1	19	45·2	15	73·3	54·4	49·9	68	...	44·0	4·90	16	4·8
Mauritius	85·0	30	66·0	13	80·0	65·0	62·0	71	...	54·0	1·36	18	6·1
Bloemfontein	84·1	11	39·0	9	77·2	51·2	50·6	62	..	...	2·39	6	4·3
Calcutta...	93·9	4	69·7	23	89·6	74·3	72·0	74	...	62·2	·29	2	3·0
Madras	96·3	12	68·6	26	92·1	75·0	70·9	70	165·5	65·4	4·34	2	3·2
Colombo, Ceylon ...	87·8	29	71·8	6, 10	85·9	74·6	73·4	83	160·1	67·8	14·76	19	7·6
Hongkong	88·2	23	67·6	26	81·6	72·5	64·2	56	...	...	·05	1	4·2
Sydney	91·6	30	42·3	3	72·0	53·4	48·7	56	141·6	47·7	·77	10	4·2
Melbourne	79·2	19	32·2	3	65·0	47·4	44·6	63	134·0	24·8	2·35	...	6·9
Adelaide	87·8	29	37·9	5	70·2	51·2	47·6	60	144·0	27·8	2·59	11	5·5
Perth	88·0	14	43·2	3	68·6	52·8	50·9	70	150·2	35·0	2·90	15	5·0
Coolgardie	97·0	15	39·8	7	77·7	51·1	43·7	42	155·0	36·0	·16	1	3·5
Brisbane	100·1	28	53·4	3	83·7	60·9	56·4	56	157·4	49·0	1·14	7	3·8
Hobart, Tasmania ...	74·5	11	34·1	3	58·6	44·0	39·9	61	138·3	29·1	3·13	22	6·8
Wellington	69·6	9	38·2	12	60·3	49·4	46·7	75	141·0	26·8	6·48	17	6·6
Jamaica, Kingston ...	92·3	12	71·6	31	88·5	73·7	72·4	82	...	...	2·17	11	7·4
Grenada	...	...	...	...	...	...	...	...	...	...	...	.	...
Toronto	73·3	10	30·0	15	60·0	42·8	44·4	88	122·6	25·0	2·84	13	5·0
Fredericton	66·8	13	21·0	20	56·8	36·1	39·2	77	...	...	4·80	11	5·5
St. John, N.B. ...	64·2	10	31·7	19	53·3	40·8	41·2	80	120·3	26·0	6·56	14	6·2
Victoria, B.C.	66·5	1	40·3	14	56·4	46·2	47·0	89	121·5	34·8	4·13	16	6·7

Johannesburg.—Bright sunshine 237·7 hours.

COLOMBO, CEYLON.—Mean temp. 80°·2, or 0°·1 above, dew point 0°·3 below, and R 1·33 in. above, averages. Mean hourly velocity of wind 3·2 miles. TS on 9 days.

HONGKONG.—Mean temp. 76°·4. Bright sunshine 234·5 hours. Mean hourly velocity of wind 10·8 miles.

Melbourne.—Mean temp. 1°·4 below, and R ·26 in. below, averages.

Adelaide.—Mean temp. 1°·2 below, and R ·87 in. above, averages.

Coolgardie.—Temp. 0°·8 below, and R about ·50 in. below, averages.

Brisbane.—Temp. above, and R below, averages. Highest shade maximum for October since 1887 with one exception.

Hobart.—Temp. below, and R ·89 in. above, averages.

Wellington.—A wet month. Mean temp. 0°·6 above, and R 2·28 in. above, averages. Bright sunshine, 160·2 hours. Frost on 2 days. TS on 2 days.

Cloud.	Aver.
8·1	
2·6	
7·2	
5·8	
4·8	
6·1	
4·3	
3·0	
3·2	
7·6	
4·2	
4·2	
6·9	
5·5	
5·0	
3·5	
3·8	
6·8	
6·6	
7·4	
...	
5·0	
5·5	
6·2	
6·7	

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REPORT OF WATER POWER COMMITTEE.

The Board of Trade Committee on the Water Power Resources of the United Kingdom, of which Sir John Snell is Chairman, has issued an Interim Report to the President of the Board of Trade which has been published by the Stationery Office as Cmd. 79 of 1919, at the price of 2d. The Report deals not with the total resources of the country but with certain specific schemes for developing water-power in the Scottish Highlands. These are representative of many others and were selected as typical instances in which large powers could be economically developed. The value of the schemes depends partly on the possibility of transmitting electrical energy to industrial centres at a distance from the generating station and partly on the possibility of establishing new industries on the sea-board close to the source of power. In both cases the controlling factor is the cost of the necessary works and this is based on the reports of eminent engineers accustomed to the planning of large works, such as the Foyers and Kinlochleven establishments of the British Aluminium Company and the North Wales works of the British Aluminium Corporation. All the estimates are based on pre-war contract prices, plus fifty per cent. The Committee states that a Water Power scheme producing 5,000 electrical horse-power continuously and fully utilised will compare favourably with the best coal-fired electric generators of equal power with coal at 10s. per ton, if the capital cost of the undertaking does not exceed £60 per e.h.p.

Nine schemes are indicated in the Report on which work could be commenced as soon as the necessary Parliamentary powers are obtained. These range from 7,200 e.h.p., at Loch Morar, to 42,000 e.h.p. for a combined system of Lochs Ericht, Laidon, Rannoch and Tummel, and the estimated capital cost varies from £17 per e.h.p. for a 9,500 e.h.p. station, at Kilmorack Falls, to nearly £46 per e.h.p. for a 38,000 e.h.p. scheme at Lochs Laggan and Treig. The total electrical horse power of the nine schemes set out is estimated at 183,500, the total estimated cost at £7,075,000, which works out at £38·5 per e.h.p. on the average. The nine schemes would produce power equal to that yielded by 1,850,000 tons of

coal per annum, a figure which shows how absurd was the estimate of the Royal Commission on Coal Supplies in 1906 that all the available water power of the British Isles would be equivalent only to 1,200,000 tons of coal per annum. We are not aware that the Royal Commission referred to took any steps to obtain an authoritative estimate of the water power of the country, and their bad shot suggests that they did not. On the other hand we must bear in mind that the dreams of unlimited power to be obtained from water, which are frequently expounded in the newspapers, are even wider of the mark. The true value of the water power of any country can only be determined by careful and long continued surveys.

We cannot enter here into all the interesting features of this Report, but we must express our appreciation of the wise action of the Government in initiating a thorough enquiry into the subject, the results of which will doubtless be more fully developed in subsequent Reports. We may, however, quote from the concluding paragraphs which are of a general nature and point the way to future developments :—

> "There is no question that a river system and its drainage area must be taken as a unit and dealt with as a whole in regard to all the water problems incidental thereto. In this connection the Committee desires to draw attention to the recommendations of Lord Elgin's Commission on Salmon Fisheries, 1902, which advocated, *inter alia*, the setting up of Watershed Boards under a Supreme Rivers Authority. . . .
>
> The Committee wishes to draw attention to the fact that the estimates of water power dealt with in this Report have only been made possible by the voluntary work of Rainfall Observers in all parts of the British Isles, which has been collected and discussed by the British Rainfall Organization during the past 58 years. If the fullest use is to be made of the water-power resources of this country, it is essential that the work of observation should not only continue, but should be encouraged and developed.
>
> Another branch of observation which has a vital bearing upon the question of water-power resources is the gauging of the flow of rivers. Great attention has been given to this subject in Canada and the United States, but only a small amount of observation has hitherto been carried out in this country.
>
> Strong evidence has been submitted to the Committee regarding the lack of adequate training facilities in the Universities and Technical Institutes of the United Kingdom for young engineers wishing to enter the field of hydro-electric development. In view of the very large extension of water power development that is practically certain to take place in the near future, both in this country, in the British Empire, and in other countries, the Committee consider it important in the interests of British industry, that steps should be taken to remedy this state of affairs. . . ."

ROYAL METEOROLOGICAL SOCIETY.

The usual annual lecture of this Society was delivered on Wednesday the 19th March, at the rooms of the Geological Society, Burlington House, by Professor Leonard Hill, F.R.S., the subject being "Atmospheric Conditions which affect Health." The President of the Society, Sir Napier Shaw, F.R.S., was in the Chair.

The lecturer first considered how far published meteorological data explained the influence of weather and climate on health and comfort, and in what way these data might be amplified to gain a better insight into this important matter. Numerous Observers make records of barometric pressure, temperature, rainfall, wind, etc., but the question arises as to whether there are not other data of greater importance and interest, which affect personal health and comfort and which might be recorded by them. Barometric pressure, is measured with much refinement of accuracy, but we have no sensibility of the pressure of the atmosphere, which acts equally upon all parts of the body. In the past much has been made of the chemical alteration of the air in crowded places, and a false doctrine has become established and made popular. Careful analysis has shown that neither is there such a deficiency of oxygen or an excess of carbonic acid or other poisonous gas in the air of crowded rooms as to affect the health of human beings. Our feelings are largely due to swelling of the membrane of the nose and of its air sinuses. The victims of the Black Hole of Calcutta died from heat stroke, not from a poisonous vitiation of the air by the exhalations of the crowd. It is the cooling and evaporative power of the atmosphere, and the radiant heat of the sun, or other source of radiant energy, which have a colossal effect on our comfort and well-being, and it is these factors which require to be measured by the student of hygiene. The dry-bulb temperature does not suffice to indicate the cooling effect, because it is a static instrument averaging the influence of the environment, while the body is a dynamic instrument keeping itself at a nearly constant body temperature by the internal combustion of food and by heat loss from the skin and respiratory membrane, the heat gain and loss both being physiologically controlled. It is cooling power acting on the body surface, not temperature, which we require to study, and as the surface of the respiratory membrane is always wet and the skin may be made relatively dry or very wet by physiological control evaporative cooling is of no less importance than cooling by convection and radiation. To estimate cooling power Prof. Hill has introduced the kata-thermometer. This is a large bulbed spirit thermometer graduated between 100 and 95°F., giving a mean temperature of 36·5°C. which is arbitrarily taken as the surface temperature of the body. The instrument is heated in water at about 80°C., until the meniscus enters the small bulb at the top

of the stem ; the rate of cooling from 100° to 95°F. is then measured in seconds. Three to five such measurements are made and the average taken gives the dry kata reading. The bulb is then covered with a wetted muslin glove, and the operation repeated. The average gives the wet kata reading. Many thousands of kata observations have been taken in this country, also many in India, Egypt, Salonica front, Mesopotamia ; also some in New York, Nigeria and Melbourne. These admit of a contrast between indoor and outdoor conditions, and the conclusion is reached by Prof. Hill that the ordinary indoor conditions of this country approximate to outdoor conditions in such a humid tropical climate as Ceylon, admittedly an enervating climate to Europeans.

The following Candidates were balloted for and elected Fellows of the Society :—Lieut. H. C. Abraham, Lieut. R. P. Batty, F. G. Beaumont, Lieut. D. F. Bowering, Lieut. A. Mervyn Davies, W. E. Frankenburg, R. E. Horton, A. A. Kidson, Samuel Kniveton, Miss L. F. Lewis, A. H. Lupton, Sergt. F. L. Nunn, Sapper E. N. Redsell, C. F. Reed, T. A. Small, Lieut. A. Stocks.

METEOROLOGICAL OBSERVATIONS AT LU-KIA-PANG, CHINA, FOR 1918.

By Rev. J. de Moidrey S.J.

We have again been favoured by the kindness of Rev. J. de Moidrey, S.J., with summaries of the meteorological observations for 1918 at Lu-Kia-Pang, China, drawn up on similar lines to those for previous years, the first of which, for the year 1914, appeared in this Magazine for April, 1916. The records up to 1913 inclusive were published in the *Meteorologische Zeitschrift*.

I.—*Barometric Pressure. Millibars.*

	8 a.m.	2 p.m.	8 p.m.	Daily Mean.
Jan.	1030·42	1028·29	1029·79	1029·57
Feb.	26·19	24·19	25·41	25·31
Mar.....	21·86	20·15	21·06	21·02
April	15·43	14·05	14·78	14·70
May	11·47	09·94	10·12	10·43
June	06·96	05·82	06·24	06·26
July	*02·78*	*01·76*	*02·31*	*02·19*
Aug.	08·20	06·99	07·55	07·47
Sept.	12·24	10·58	11·70	11·40
Oct.	20·35	18·51	19·69	19·44
Nov.	24·24	22·41	23·82	23·44
Dec.	26·13	23·95	25·20	25·08
Year	1017·19	1015·55	1016·47	1016·36

IV.—*Mean amount of Cloud.*

Jan.	2·2
Feb.	6·7
Mar.	7·1
April	7·6
May	7·4
June	8·7
July	6·9
Aug.	5·6
Sept.	5·8
Oct.	4·9
Nov.	6·8
Dec.	8·0
Year	6·5

V.—*Days with Thunderstorms.*

Jan	—
Feb.	—
Mar.	—
April	2*a*
May	2
June	2
July	3
Aug.	8
Sept.	—
Oct.	—
Nov.	2*b*
Dec.	—
Year	19

a First, April 20 *b* Last, November 5.

II.—*Temperature. Degrees Centigrade.*

	MEAN DAILY.			MINIMUM.				
	Mean.	Lowest.	Highest.	Mean.	Hour. A.M. hr. min.		Lowest.	Highest.
	°	°	°	°			°	°
Jan.	*+0·27*	*—3·2*	+3·5	*—4·6*	4	55	*—8·2*	+0·5
Feb.	·5·43	+1·2	15·7	+1·5	5	25	—4·0	11·9
Mar.	7·82	1·9	15·6	4·1	4	40	—2·9	11·0
April	13·44	7·7	20·3	9·8	4	10	+1·7	15·6
May	18·73	12·4	23·4	14·2	4	0	7·8	19·9
June	23·08	18·3	29·3	19·7	3	40	14·0	25·0
July	26·97	22·6	29·2	23·7	3	55	20·8	**25·8**
Aug.	**27·24**	23·8	**29·8**	**23·8**	4	5	21·3	25·3
Sept.	22·87	17·2	27·8	19·1	4	45	12·3	25·2
Oct.	17·42	14·2	21·2	13·1	4	40	8·6	19·5
Nov.	11·07	4·9	18·9	8·0	4	55	0·5	17·4
Dec.	6·84	—0·6	11·9	4·9	4	35	—4·6	10·4
Year	15·10	—3·2*a*	29·8*b*	11·4	4	30	—8·2*c*	25·8*d*

Latest frost, March 2nd (—2°·9); earliest, December 10th (—0°·3).

II.—(*con.*)

	MAXIMUM					RANGE.		
	Mean.	Hour. P.M. hr. min		Lowest.	Highest.	Mean.	Lowest.	Highest.
	°			°		°	°	°
Jan.	*+6·9*	14	10	*+1·2*	+13·4	**11·5**	4·3	16·8
Feb.	10·9	13	55	3·7	26·1	9·4	2·5	**19·4**
Mar.	12·6	13	50	5·3	25·5	8·5	2·6	19·2
April	18·1	13	35	10·6	29·1	8·3	*1·3*	17·5
May	24·4	13	40	15·5	31·0	10·2	3·7	14·9
June	27·3	13	35	20·9	34·7	7·6	2·3	14·6
July	31·3	14	5	24·8	**35·6**	7·6	2·1	10·8
Aug.	**32·0**	13	40	26·0	35·4	8·2	3·5	11·2
Sept.	28·4	13	25	22·0	33·5	9·2	5·0	13·1
Oct.	23·7	13	5	18·2	27·1	10·6	2·8	15·5
Nov.	15·3	13	15	10·4	23·1	7·3	1·8	15·4
Dec.	9·6	13	10	2·8	15·1	*4·6*	*1·3*	11·2
Year	20·0	13	35	1·2*e*	35·6*f*	8·6	1·3*g*	19·4*h*

a Jan. 8. *b* Aug. 16. *c* Jan. 3. *d* July 8. *e* Jan. 7. *f* July 27. *g* April 6, Dec. 22. *h* Feb. 25

III.—*Relative Humidity. Per Cent.*

	RELATIVE HUMIDITY.			VAPOUR TENSION.		
	Mean.	Lowest.	Highest.	Mean.	Lowest.	Highest.
Jan.	*60*	*42*	82	*2·7*	*1·7*	4·6
Feb.	73	44	94	4·9	2·9	8·4
Mar.	79	54	97	6·6	4·0	9·5
April	80	55	95	9·7	6·2	14·9
May	71	48	95	12·2	8·0	17·2
June	81	62	**98**	17·9	12·1	24·8
July	**83**	68	97	22·6	19·1	**26·1**
Aug.	81	68	94	**22·8**	17·6	24·5
Sept.	77	57	94	16·8	8·3	23·8
Oct.	76	60	89	11·9	8·6	16·8
Nov.	80	61	97	8·4	4·7	15·4
Dec.	**83**	69	**98**	6·4	3·2	9·5
Year	77	42	98	11·9	1·7	26·1

(*To be continued*).

Correspondence.

To the Editor of Symons's Meteorological Magazine

RAINFALL AT HAVANA AND IN SOUTH-WEST ENGLAND.

For several years past attention has been drawn to the connection between the rainfall at Havana during the wet season, May to October, and that subsequently experienced in the south-west of England during the three months, January to March. This connection is shown by the correlation coefficient of —0·54, and implies that a heavy seasonal rainfall at Havana should be followed by a light rainfall during January to March in England S.W., and *vice versa*.

During May to October, 1918, the rainfall at Havana was only 42 per cent. of the fifty years' average, being the smallest amount for the season since the record started in 1859. In the south-west England for the three months now just closing the rainfall has been phenomenally heavy, the total being 155 per cent. of the average, and the wettest three first months of the year since at least 1878. Nine weeks out of the thirteen have been wetter than the average, one or two showing very large totals.

The following table gives the seasonal figures for the two districts during the past few years.

	Havana, May-October.	England, S.W., Jan.-March following.		Havana, May-October.	England, S.W. Jan.-March following.
1905 ..	49	148	1912 ..	108	139
1906 ..	143	66	1913 ..	87	138
1907 ..	60	84	1914 ..	71	129
1908 ..	116	82	1915 ..	82	126
1909 ..	101	116	1916 ..	74	67
1910....	108	81	1917 ..	57	94
1911 ..	66	146	1918 ..	42	155

A. HAMPTON BROWN.

70, Victoria Street, S.W. 1, March 31st, 1919.

SNOW FOLLOWING FINE WEATHER.

The following considerations seem to show that the sequence of weather to which Dr. C. P. Hooker calls attention in your last issue, where an exceptionally fine day in early spring is followed by snow within a short period, is capable of a reasonable explanation. It not infrequently happens that a short period of brilliantly fine

weather is found in the rear of an anticyclone which is being pushed away eastward by a depression advancing towards this country from the Atlantic. If the advancing depression takes a southerly track and moves up the English Channel the cold north or north-east winds in its rear may very probably be accompanied by snowfall in the south of England, and thus snow following shortly after a brilliantly fine day is seen to be not improbable. On the other hand there must surely be many such fine days which are unassociated with a subsequent snowfall. If Dr. Hooker could supply the dates in previous years on which he has noticed this phenomenon it would be easy to test the above hypothesis. A study of the synoptic charts for the date in early March quoted in his letter shows that that occasion was of this type although it did not form a very good example and I doubt whether the fineness of March 2nd extended over a very wide area. At Benson, in South Oxfordshire, it was, as far as I remember, not an exceptionally fine day.

66, Sydney Street, S.W. 3, March 27th, 1919. J. S. DINES.

THE SLING OR WHIRLED PSYCHROMETER.

In the number of years in which I have been an interested reader of your Magazine I am unable to recall any reference or discussion as to the respective merits of wet and dry bulb thermometers and the sling, or whirled psychrometer. For some years I have been obtaining the relative humidity and dew point from the former, and not very long ago made a series of comparisons of the readings of both instruments. The wet and dry bulb thermometers were exposed in a standard instrument shelter, and sling psychrometer was whirled in the immediate vicinity facing the wind. I found such a wide difference in the readings that I have discarded the older instrument and now use the sling. In fact I do not consider the records observed on the old type as scientifically accurate.

The United States Weather Bureau began the use of the sling psychrometer in 1886. In connection with this instrument they say :—

> "The most reliable instrument for this purpose (to observe the difference between the temperatures indicated by wet and dry bulb thermometers) is the sling, or whirled psychrometer. In special cases rotary fans, or other means, may be employed to move the air rapidly over the thermometer bulbs. In any case satisfactory results cannot be obtained from observations in relatively stagnant air. A strong ventilation is absolutely necessary to accuracy."

When temperatures are below the freezing point the ease and celerity with which observations can be taken with the sling is very satisfactory. CHAS. DECKER.

Narberth, Pa., U.S.A., February 14th, 1919.

WET FIRST QUARTER OF YEAR.

I find that only twice during eighty years have we had more than 12 inches of rain in the first quarter of any year, and my object in looking up the figures was to find out whether there were droughts in the following quarters.

I send you the result of my search and the eighty years average.

	First Quarter in.	Second Quarter in.
Average 1839-1918 ..	6·48	5·34
,, 1844 ..	12·17	2·09
,, 1866 ..	12·76	3·96
,, 1919 ..	12·92	—

West Gate, Chichester, April 1st, 1919. G. ASHLEY TYACKE.

THE rainfall at Totland Bay during the first quarter of the year 1919 amounts to 12·48 in. Our average here for this period is 6·46 in. The only first quarters giving over 10 inches total during my residence of thirty-three years have been :—

	1897	*1900*	*1906*	*1912*	*1919*
January ..	2·45	3·60	6·80	4·12	4·81
February ..	3·41	5·07	3·13	2·62	2·83
March ..	4·30	1·47	1·44	3·41	4·84
Total ..	10·16	10·14	11·37	10·15	12·48

JOHN DOVER.

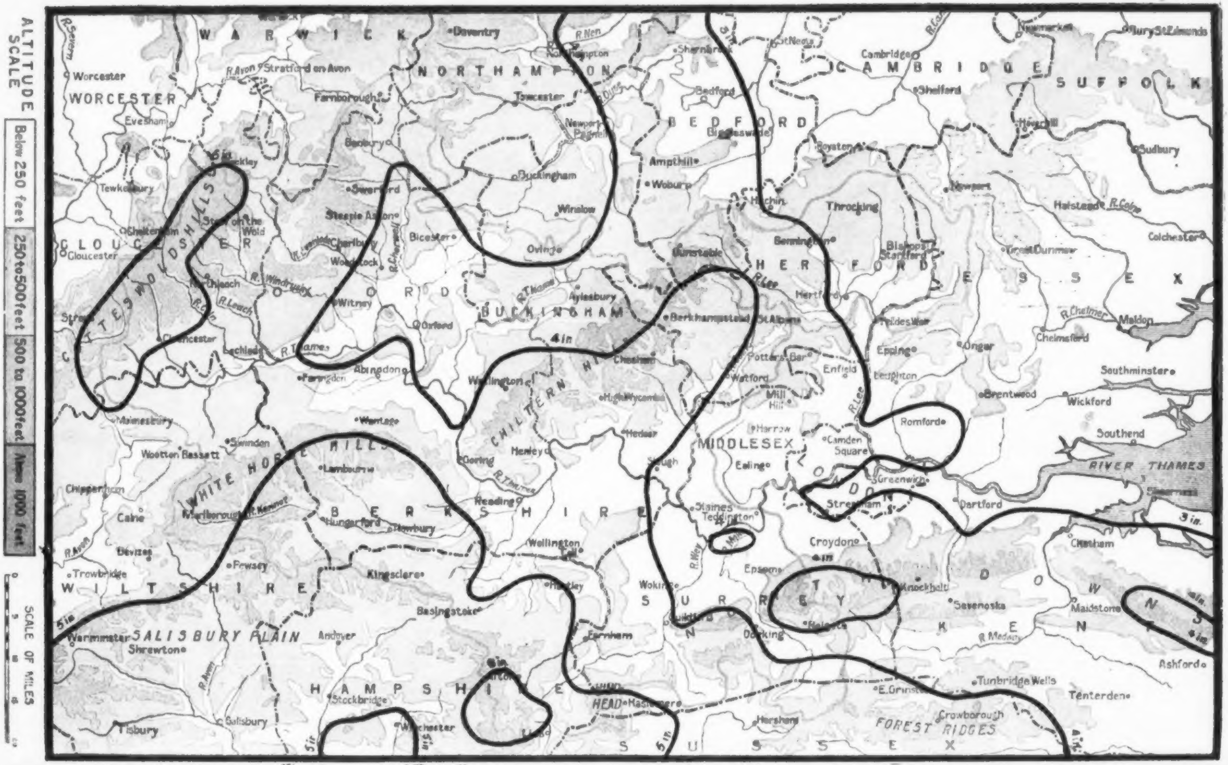
Aston House, Totland Bay, Isle of Wight, 1st April, 1919.

REMARKABLE UNIFORMITY OF TEMPERATURE.

THE phenomenon mentioned by the Rev. T. E. R. Phillips of a fall of temperature by day and a rise by night during cold, cloudy, easterly weather in winter is one which I have often noticed; but I believe it is more pronounced in the south of England than elsewhere. The explanation, I believe, is that in this type of weather there is severe cold on the Continent, often with clear skies, and the low temperature of early morning is carried to our shores by the east wind in the course of the day, while the higher temperature of the sunny daytime on the Continent similarly arrives during the following night. Our skies are cloudy owing to the vapour gathered by the wind in crossing the North Sea, hence the warming influence of the sun by day is shut out from us. I have noticed this inversion of the usual temperature change here in Lincolnshire, but it used to be more pronounced in Hertfordshire. ALLAN ELLISON.

Althorpe Rectory, Lincolnshire. March 27th, 1919.

THAMES VALLEY RAINFALL. MARCH. 1919.



THE WEATHER OF MARCH.

SOME of the most disagreeable weather we experience in these islands occurs when the country occupies a position between two areas of high barometric pressure. The intervening trough forms a prolific breeding ground for cyclonic depressions; and as the driving power (if one may so express it) of the nearest high pressure system is largely restrained by the driving power of its more distant compeer such disturbances usually move slowly, and the accompanying bad weather is consequently of a more or less lingering character.

These were the conditions prevailing during a considerable portion of last month. A large anticyclone maintained a fairly normal position over the south of the North Atlantic, but at frequent intervals there was a second high pressure system in existence, sometimes in the Icelandic region, at other times over northern Europe. In these circumstances the British Isles were exposed to numerous depressions, many of which travelled in a general easterly course over our southern districts, the Channel and the north of France. In the south the winds showed considerable variability in direction, but over the country as a whole they were more often than not from some polar quarter, and as a result the mean temperature of the month was considerably below the average.

During the earlier half the weather was changeable and wet, more especially in the western districts. Temperature was usually below the normal, but, during a brief period of south-westerly winds which prevailed at the beginning of the month, and a similar spell which occurred between the 9th and 11th, the thermometer rose slightly above 55° in many parts of England. Sharp frost was experienced, however, in Ireland and Scotland on the night of the 3rd, over England on the night of the 5th, and over the United Kingdom generally between the 13th and 15th.

After about the middle of the month the weather (contrary to rule) became colder even than in the earlier half, and between the 23rd and 26th, when an anticyclonic band extended temporarily from south-west to north-east across the United Kingdom, sharp frosts were experienced in all districts. In many parts of England the screened thermometer fell below 25°, and at some northern stations below 20°, a minimum of 11° being reported on the 25th at Balmoral. On the 26th and 27th the passage south-eastward of a deep storm system from Iceland to Scotland, and thence across the North Sea was accompanied by a general gale from the N.W.; and, on the night of the 28th-29th, when a secondary depression moved eastward along the Channel, a heavy fall of snow was experienced in the south of England. In London the flakes were of a remarkably fine texture, and although the ground was covered to the unusual depth of 7 to 10 inches, the snow, when melted, did not yield more than ·25 in. to ·30 in. of water in the gauge.

The total duration of bright sunshine for the month was below the average in all districts except the north and east of Scotland.

The total rainfall of the month exceeded twice the average over practically all England and Wales, except in the eastern and extreme northern counties. The amounts varied from about 2 inches in East Anglia to more than 5 inches over large areas in the south and Midlands, and rose to above 10 inches in the Welsh mountains and the Lake District. In Scotland the excess was not remarkable and in many areas the fall was short of the average. Less than 2 inches fell on the east coast and from 5 to 10 inches in the wettest parts of the Highlands. Ireland was wet generally, but a few scattered stations had less than the average. Less than 2 inches fell over the centre, and 5 inches was exceeded only in the extreme west.

The general rainfall expressed as a percentage of the average was :—England and Wales, 196; Scotland, 105; Ireland, 112; British Isles, 143.

In London (Camden Square) the mean temperature was 40°·5, or 1°·6 below the average. The duration of sunshine was 83·3 hours, and of rainfall 103·2, hours the latter being the highest value recorded in March in the past thirty-nine years, except in March, 1916, when it rained for 133·6 hours. Evaporation, ·66 inches.

RAINFALL TABLE FOR MARCH, 1919.

STATION.	COUNTY.	RAINFALL. Aver. 1875–1909. in.	1919. in.	Diff. from Av. in.	Per cent. of Av.	Max. in 24 hours. in.	Max. in 24 hours. Date.	No. of Days
Camden Square	*London*	1·70	3·62	+1·92	213	·88	19	21
Tenterden	*Kent*	1·95	3·51	+1·56	180	·70	5	20
Arundel (Patching)	*Sussex*	1·95	5·36	+3·41	275	1·14	19	19
Fordingbridge (Oaklands)	*Hampshire*	2·09	5·47	+3·38	261	1·11	19	19
Oxford (Magdalen College)	*Oxfordshire*	1·45	3·76	+2·31	259	1·01	19	22
Wellingborough (Swanspool)	*Northampn*	1·72	3·91	+2·19	228	·94	19	20
Bury St. Edmunds (Westley)	*Suffolk*	1·71	2·40	+ ·69	140	·32	7	17
Geldeston [Beccles]	*Norfolk*	1·57	1·78	+ ·21	113	·27	7	17
Polapit Tamar [Launceston]	*Devon*	2·74	5·37	+2·63	196	·68	10	23
Rousdon [Lyme Regis]	,,	2·30	4·95	+2·65	215	1·12	18	19
Stroud (Field Place)	*Gloucester*	2·01	4·37	+2·36	218	...	...	...
Church Stretton (Wolstaston)	*Shropshire*	2·19	5·29	+3·10	241	1·36	12	9
Boston	*Lincoln*	1·47	2·47	+1·00	168	·43	19	22
Worksop (Hodsock Priory)	*Nottingham*	1·70	3·59	+1·89	211	·85	11,19	15
Mickleover Manor	*Derbyshire*	1·69	5·23	+3.54	309	1·27	19	21
Congleton (Buglawton Vic.)	*Cheshire*	2·16	4·90	+2·74	227	·82	11	21
Southport (Hesketh Park)	*Lancashire*	2·11	5·31	+3·20	252	1·25	11	17
Wetherby (Ribston Hall)	*York, W.R.*	1·92	3·88	+1·96	202	1·23	19	11
Hull (Pearson Park)	,, *E.R.*	1·84	2·67	+ ·83	145	·55	11	17
Newcastle (Town Moor)	*North'land*	2·10	2·76	+ ·66	131	·53	9	18
Borrowdale (Seathwaite)	*Cumberland*	10·63	11·30	+ ·67	106	...	...	...
Cardiff (Ely)	*Glamorgan*	2·89	5·97	+3·08	207	·64	18	22
Haverfordwest	*Pembroke*	3·16	5·55	+2·39	176	1·20	18	20
Aberystwyth (Gogerddan)	*Cardigan*	3·04	8·57	+5·53	282	1·97	11	19
Llandudno	*Carnarvon*	2·13	5·75	+3·62	270	1·55	11	24
Cargen [Dumfries]	*Kirkcudbrt.*	3·33	4·83	+1·50	145	2·11	19	13
Marchmont House	*Berwick*	2·64	2·78	+ ·14	105	·44	19	18
Girvan (Pinmore)	*Ayr*	3·62	4·37	+ ·75	121	1·03	20	14
Glasgow (Queen's Park)	*Renfrew*	2·61	2·62	+ ·01	100	·65	19	10
Islay (Eallabus)	*Argyll*	3·68	5·23	+1·55	142	1·02	18	19
Mull (Quinish)	,,	4·28	4·24	— ·04	99	·76	18	21
Loch Dhu	*Perth*	6·29	5·95	— ·34	95	1·15	19, 26	13
Dundee (Eastern Necropolis)	*Forfar*	2·06	1·64	— ·42	80	·42	19	18
Braemar	*Aberdeen*	2·87	4·51	+1·64	157	1·00	27	16
Aberdeen (Cranford)	,,	2·65	2·16	— ·49	82	·47	27	20
Gordon Castle	*Moray*	2·36	2·09	— ·27	89	...	...	...
Drumnadrochit	*Inverness*	3·09	2·72	— ·37	88	·85	26	21
Fort William	,,	6·39	3·95	—2·44	62	1·22	26	19
Loch Torridon (Bendamph)	*Ross*	7·29	7·99	+ ·70	110	2·29	26	20
Dunrobin Castle	*Sutherland*	2·64	2·77	+ ·13	105	·55	26	10
Glanmire (Lota Lodge)	*Cork*	3·09	3·07	— ·02	99	·40	13	20
Killarney (District Asylum)	*Kerry*	4·51	3·71	— ·80	82	·52	28	27
Waterford (Brook Lodge)	*Waterford*	2·64	2.96	+ ·32	112	·36	3	23
Nenagh (Castle Lough)	*Tipperary*	2·99	3·29	+ ·30	110	·46	12	25
Ennistymon House	*Clare*	3·24	3.11	— ·13	96	·41	12	19
Gorey (Courtown House)	*Wexford*	2·28	2·48	+ ·20	109	·39	28	14
Abbey Leix (Blandsfort)	*Queen's Co.*	2·59	2·94	+ ·35	113	·62	4	22
Dublin (Fitz William Square)	*Dublin*	1·98	2·19	+ ·21	111	·38	18	21
Mullingar (Belvedere)	*Westmeath*	2·64	1·83	— ·81	69	·42	19	15
Crossmolina (Enniscoe)	*Mayo*	4·36	5·39	+1·03	124	·95	6	26
Cong (The Glebe)	,,	3·80	..	...	...	...	...	...
Collooney (Markree Obsy.)	*Sligo*	3·33	4·07	+ ·74	122	·66	17	20
Seaforde	*Down*	2·84	3·86	+1·02	136	1·45	18	17
Ballymena (Harryville)	*Antrim*	3·07	4·70	+1·63	153	1·22	17	22
Omagh (Edenfel)	*Tyrone*	2·98	·99	+1·01	134	.88	18	

SUPPLEMENTARY RAINFALL, MARCH, 1919.

Div.	STATION.	Rain inches.	Div.	STATION.	Rain inches.
II.	Warlingham, Redvers Road..	4·86	XI.	Lligwy	5·18
,,	Ramsgate	2·70	,,	Douglas, Isle of Man	4·72
,,	Hailsham	4·39	XII.	Stoneykirk, Ardwell House...	3·49
,,	Totland Bay, Aston House...	4·84	,,	Carsphairn, Shiel	6·81
,,	Stockbridge, Ashley..	4·85	,,	Langholm, Drove Road	4·95
,,	Grayshott	5·44	XIII.	Selkirk, The Hangingshaw..	4·73
,,	Upton Nervet	5·35	,,	North Berwick Reservoir.....	1·47
III.	Harrow Weald, Hill House...	3·48	,,	Edinburgh, Royal Observaty.	1·34
,,	Pitsford, Sedgebrook.....	4·11	XIV.	Biggar.....	2·24
,,	Woburn, Milton Bryant.....	...	,,	Maybole, Knockdon Farm ...	2·45
,,	Chatteris, The Priory.....	2·08	XV.	Shiskine	5·57
IV.	Elsenham, Gaunts End	2·63	,,	Ardgour House	4·81
,,	Shoeburyness	...	,,	Oban.....	3·16
,,	Colchester, Hill Ho., Lexden	2·21	,,	Holy Loch, Ardnadam.....	6·81
,,	Aylsham, Rippon Hall	2·04	,,	Loch Venachar.....	4·95
,,	Swaffham	2·26	XVI.	Glenquey	3·90
V.	Bishops Cannings	4·85	,,	Loch Rannoch, Dall	3·29
,,	Weymouth.....	4·68	,,	Blair Atholl	2·66
,,	Ashburton, Druid House.....	7·03	,,	Coupar Angus	1·90
,,	Cullompton	4·99	,,	Montrose, Sunnyside Asylum.	1·54
,,	Lynmouth, Rock House	6·01	XVII.	Balmoral	3·25
,,	Okehampton, Oaklands.....	6·44	,,	Fyvie Castle	3·13
,,	Hartland Abbey.....	3·88	,,	Keith Station	3·04
,,	St. Austell, Trevarna	5·90	XVIII.	Rothiemurchus	...
,,	North Cadbury Rectory.....	4·65	,,	Loch Quoich, Loan	10·40
VI.	Clifton, Stoke Bishop	5·70	,,	Skye, Dunvegan	6·23
,,	Ledbury, Underdown..... ...	4·61	,,	Fortrose.....	1·95
,,	Shifnal, Hatton Grange.....	4·78	,,	Glencarron Lodge	5·25
,,	Droitwich.....	3·97	XIX.	Tongue Manse	3·99
,,	Blockley, Upton Wold.....	5·42	,,	Melvich	3·46
VII.	Grantham, Saltersford.....	3·92	,,	Loch More, Achfary	7·27
,,	Louth, Westgate	3·22	XX.	Dunmanway, The Rectory ..	4·65
,,	Bawtry, Hesley Hall	3·15	,,	Mitchelstown Castle.....	2·92
,,	Derby, Midland Railway.....	4·41	,,	Gearahameen	7·50
VIII.	Nantwich, Dorfold Hall	5·28	,,	Darrynane Abbey.....	4·54
,,	Bolton, Queen's Park	7·31	,,	Clonmel, Bruce Villa	2·90
,,	Lancaster, Strathspey	4·41	,,	Roscrea, Timoney Park	2·48
IX.	Langsett Moor, Up. Midhope	5·67	,,	Broadford, Hurdlestown.....	2 96
,,	West Witton	4·87	XXI.	Enniscorthy, Ballyhyland...	3·30
,,	Scarborough, Scalby	4·94	,,	Rathnew, Clonmannon	2·21
,,	Ingleby Greenhow	4·33	,,	Hacketstown Rectory	...
,,	Mickleton	1·50	,,	Ballycumber, Moorock Lodge	1·61
X.	Bellingham, High Green Manor	2·87	,,	Balbriggan, Ardgillan	2·18
,,	Ilderton, Lilburn Cottage ...	2·47	,,	Castle Forbes Gardens.....	2·26
,,	Keswick, The Bank.....	5·03	XXII.	Ballynahinch Castle.....	3·93
,,	Orton.....	6·05	,,	Woodlawn	1·11
XI.	Llanfrechfa Grange	6·43	,,	Westport House	3·77
,,	Treherbert, Tyn-y-waun	10·90	,,	Dugort, Slievemore Hotel ...	6·07
,,	Carmarthen, The Friary	6·42	XXIII.	Enniskillen, Portora.....	2·67
,,	Fishguard, Goodwick Station.	4·12	,,	Dartrey [Cootehill]	2·76
,,	Crickhowell, Tal-y-maes.....	6·50	,,	Warrenpoint, Manor House ..	2·71
,,	Birmingham WW., Tyrmynydd	8·12	,,	Belfast, Cave Hill Road	4·29
,,	Lake Vyrnwy	7·43	,,	Glenarm Castle	3·37
,,	Llangynhafal, Plas Drâw.....	4·70	,,	Londonderry, Creggan Res...	4·68
,,	Rhiwbryfdir	11·99	,,	Milford Manse	4·06
,,	Dolgelly, Bryntirion.....	8·70	,,	Killybegs	6·54

Climatological Table for the British Empire, October, 1918.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Absolute. Maximum. Date.	Absolute. Minimum. Temp.	Absolute. Minimum. Date.	Average. Max.	Average. Min.	Average. Dew Point.	Average. Humidity.	Absolute. Max. in Sun.	Absolute. Min. on Grass.	Total Rain. Depth.	Total Rain. Days.	Aver. Cloud.
	°		°		°	°	°	0-100	°	°	inches		
London, Camden Square	64·5	6	32·4	1	57·2	43·8	...	90	113·6	28·2	1·23	16	8·1
Malta	86·0	1	57·0	10	73·9	65·7	62·5	82	133·5	53·5	4·28	9	2·6
Lagos	90·0	24	69·4	8	86·1	74·1	73·4	77	162·4	66·0	4·11	14	7·2
Cape Town	83·9	27	40·9	4	69·9	54·1	53·4	73	...	...	1·73	10	5·8
Johannesburg	83·1	19	45·2	15	73·3	54·4	49·9	68	...	44·0	4·90	16	4·8
Mauritius	85·0	30	60·6	13	80·0	65·0	62·0	71	...	54·0	1·36	18	6·1
Bloemfontein	84·1	11	39·0	9	77·2	51·2	50·6	62	..	...	2·39	6	4·3
Calcutta...	93·9	4	69·7	23	89·6	74·3	72·0	74	...	62·2	·29	2	3·0
Madras	96·3	12	68·6	26	92·1	75·0	70·9	70	165·5	65·4	4·34	2	3·2
Colombo, Ceylon ...	87·8	29	71·8	6, 10	85·9	74·6	73·4	83	160·1	67·8	14·76	19	7·6
Hongkong	88·2	23	67·6	26	81·6	72·5	64·2	66	...	...	·05	1	4·2
Sydney	91·6	30	42·3	3	72·0	53·4	48·7	56	141·6	47·7	·77	10	4·2
Melbourne	79·2	19	32·2	3	65·0	47·4	44·6	63	134·0	24·8	2·35	...	6·9
Adelaide	87·8	29	37·9	5	70·2	51·2	47·6	60	144·0	27·8	2·59	11	5·5
Perth	88·0	14	43·2	3	63·6	52·3	50·9	70	150·2	35·0	2·90	15	5·0
Coolgardie	97·0	15	39·8	7	77·7	51·1	43·7	42	155·0	36·0	·16	1	3·5
Brisbane	100·1	28	53·4	3	83·7	60·9	56·4	56	157·4	49·0	1·14	7	3·8
Hobart, Tasmania ..	74·5	11	34·1	3	58·6	44·0	39·9	61	138·3	29·1	3·13	22	6·8
Wellington	69·6	9	38·2	12	60·3	49·4	46·7	75	141·0	26·8	6·48	17	6·6
Jamaica, Kingston ...	92·3	12	71·6	31	88·5	73·7	72·4	82	...	...	2·17	11	7·4
Grenada	...	...	...	...	...	...	...	...	...	...	...	.	...
Toronto	73·3	10	30·0	15	60·0	42·8	44·4	88	122·6	25·0	2·84	13	5·0
Fredericton	66·8	13	21·0	20	56·8	36·1	39·2	77	...	...	4·80	11	5·5
St. John, N.B. ...	64·2	10	31·7	19	53·3	40·8	41·2	80	120·3	26·0	6·56	14	6·2
Victoria, B.C.	66·5	1	40·3	14	56·4	46·2	47·0	89	121·5	34·8	4·13	16	6·7

Johannesburg.—Bright sunshine 237·7 hours.

COLOMBO, CEYLON.—Mean temp. 80°·2, or 0°·1 above, dew point 0°·3 below, and R 1·33 in. above, averages. Mean hourly velocity of wind 3·2 miles. TS on 9 days.

HONGKONG.—Mean temp. 76°·4. Bright sunshine 234·5 hours. Mean hourly velocity of wind 10·8 miles.

Melbourne.—Mean temp. 1°·4 below, and R ·26 in. below, averages.

Adelaide.—Mean temp. 1°·2 below, and R ·87 in. above, averages.

Coolgardie.—Temp. 0°·8 below, and R about ·50 in. below, averages.

Brisbane.—Temp. above, and R below, averages. Highest shade maximum for October since 1887 with one exception.

Hobart.—Temp. below, and R ·89 in. above, averages.

Wellington.—A wet month. Mean temp. 0°·6 above, and R 2·28 in. above, averages. Bright sunshine, 160·2 hours. Frost on 2 days. TS on 2 days.